

November 17, 1997

Mr. Roy Crystal U.S. EPA Region 1 Mail Code: SEA Air Pesticides and Toxics JFK Federal Building Boston, MA 02203

RE: Superior Plating's Chromium Emissions Test Results

Dear Mr. Crystal:

Please find enclosed the "Emissions Test Results" report for Superior Plating Company located in Southport, Connecticut. This testing was completed to meet the requirements of the Chromium Emissions NESHAP MACT Standard. Superior Plating currently utilizes two fiber bed demisters (FBDs) to control emissions from 21 chromium electroplating tanks. Your review of the "Emissions Test Results" report will show that tested emissions from these two FBD control devices are greater than the applicable emissions limitation of 0.015 mg/dscm. The remainder of this letter will explain the intensive efforts undertaken by Superior in the last year to improve the performance of these existing control devices, and current efforts being completed to install three state-of-the-art composite mesh pad control devices that are guaranteed by the scrubber manufacturer to reduce chromium emissions to less than 0.002 mg/dscm.

BACKGROUND

Superior Plating has completed five emissions tests, and has reconfigured their existing FBDs multiple times in a sincere attempt to bring their facility into compliance with the emissions requirements of the MACT standard. The following paragraphs detail their efforts.

The configuration of the existing FBDs is such that the fiber bed filters must be removed for cleaning. Superior's compliance strategy assumed, that over time the FBD filters become increasingly saturated with chromium, and as a result their ability to effectively control emissions deteriorates. It was also hypothesized that periodic cleaning of the filter pads would restore the filter's effectiveness.

Therefore, it became necessary to determine the appropriate time interval from one filter cleaning to the next filter cleaning that would guarantee the FBDs were effectively controlling emissions to less than 0.015 mg/dscm. To determine this time interval, multiple performance tests were completed.

The first preliminary chromium emissions testing was completed on 7/18/96 after **new** fiber bed filters were installed. The results of this first testing were extremely low. FBD #2 tested at an emissions rate of 0.0004 mg/dscm, and FBD #3 tested at 0.0008 mg/dscm. These test results led us to believe that the existing control devices were capable of meeting the applicable emissions limitation of 0.015 mg/dscm.

Having successfully "passed" the first preliminary emissions testing, Superior completed another preliminary test three months after the first preliminary testing. The purpose of this testing was to demonstrate that a three-month time interval from one cleaning of the fiber bed filters to the next cleaning was sufficient to maintain chromium emissions below 0.015 mg/dscm. This "three-month" testing was completed on 10/28/96. FBD #2 "passed" the test with an emissions rate of 0.014 mg/dscm and FBD #3 "failed" the tests with an emissions rate of 0.030 mg/dscm. The results of this second test led us to believe that FBD #2 would successfully pass the test with a cleaning interval of 3 months and that the cleaning interval for FBD #3 should be reduced to 2 months or less.

Both FBDs were then retested one-month (1/27/97) after cleaning the fiber beds with the understanding that if both FBDs "passed", we would retest again at 2 months. Both FBDs "failed" the testing, with FBD #2 measuring an emissions rate of 0.054 mg/dscm and FBD #3 measuring 0.023 mg/dscm. At this point, we focused our efforts to FBD #3. Superior researched modifications that could be made to restore its ability to control emissions. If the modifications to FBD #3 proved successful, the same modifications would be made to FBD #2.

On 4/24/97 emissions testing was completed again on only FBD #3 after significant changes were made to the fiber beds. The fiber beds were sealed together tightly and doubled in thickness. The emissions rate for FBD #3 measured at 0.018 mg/dscm. The modifications resulted in a slight improvement in the performance of the FBD.

On 7/29/97 both FBD's were tested again. This testing was completed three weeks after the filter beds were cleaned. The emissions rates for FBD #2 and FBD #3 were 0.068 and 0.048 mg/dscm. Both units failed to meet the emissions limit. The conclusion we drew from this testing was that periodic cleaning of the filter pads does not improve the performance of the FBDs as originally theorized.

Compliance testing was completed on 8/29/97. Superior attempted to improve the performance of the FBDs prior to compliance testing by installing composite mesh pad material over the fiber bed filters. Again both FBDs emissions

rates exceeded the 0.015 mg/dscm limitation as shown in the included "Emissions Test Report".

INSTALLATION OF NEW COMPOSITE MESH PAD SCRUBBERS

As a result of failing the compliance testing, Superior has chosen to install three new 40,000 cfm composite mesh pad mist eliminators (CMPs). The manufacturer of these CMPs, Midwest Air Products Company of Traverse City, Michigan, guarantees they will reduce chromium emission to less than 0.002 mg/dscm. Superior has placed the purchase order for these CMPs and has contracted the design and installation of the system. Please see the attached purchase order number 17281. The installation of these new CMPs will require Superior to retrofit their entire facility. Completely new ducting will be installed and the existing ducting will be abandoned. Large scale structural and mechanical modifications will also have to be made to Superior's facility to accommodate the installation. Preliminary drawings for the installation are included as an attachment to this letter as well as a Gantt chart illustrating the preliminary schedule for the project. The expected cost of these new ventilation systems and installation will exceed \$600,000. Superior is dedicating all available resources to the prompt and successful completion of this installation project.

CONCLUSION

Superior Plating has invested much time and effort attempting to bring the existing FBD control devices into compliance with the Chromium Electroplating MACT standard, but has fallen short of the 0.015 mg/dscm emissions rate limitation. Superior wishes to bring themselves into compliance as soon as possible. Therefore, Superior has purchased new state-of-the-art control devices and is currently expediting installation of these devices. Superior will continue to maintain the existing FBD control devices to minimize chromium emissions until the new CMP control devices are installed and functioning. Superior Plating would like to schedule a meeting with U.S. EPA to discuss the emissions testing results and Superior's future compliance strategy. I will call you in the next few weeks to schedule this meeting.

Sincerely,

Air Tox Environmental Company Inc.

Dan Aune

Project Manager

an am

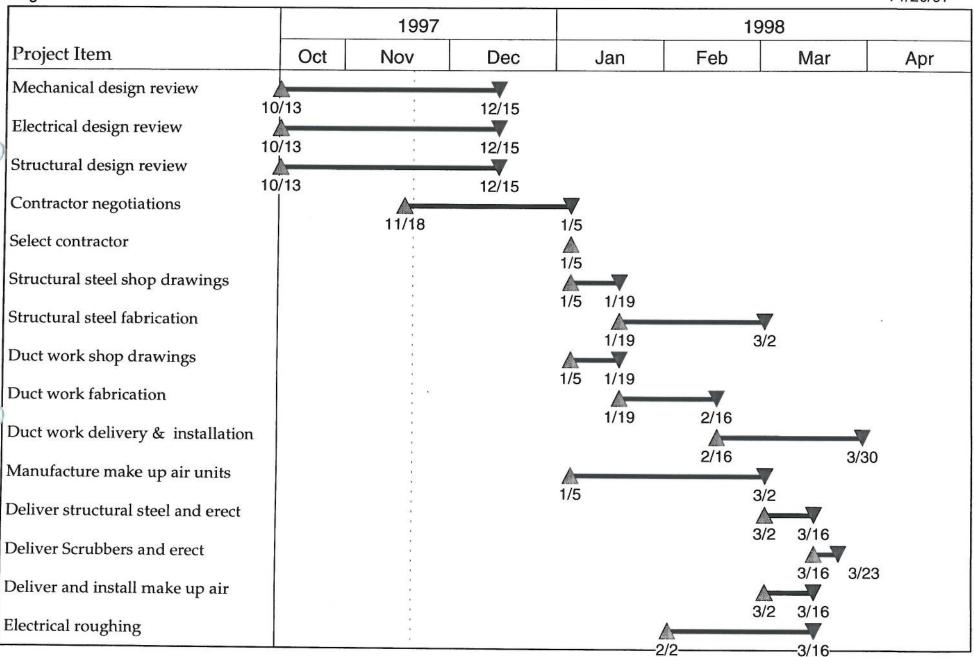
cc: George Miller, Connecticut Department of Environmental Protection

Attachments

Superior Plating Fume Scrubber Installations

Page 1 of 2

11/20/97



Superior Plating Fume Scrubber Installations

Page 2 of 2

11/00/07

						11/20/97
	1997			19	98	
Oct	Nov	Dec	Jan	Feb	Mar	Apr
	3 .+ 31			<u> </u>		2.0
			2	2/2		
					3/16 3/2	
					\triangle	
	į			_	3/27	
				2/23	3/27	
			1/19 1/3	30		<u>^</u> 4/7
	ĺ					4/7
	61 62 54					4/24
	:					
	:					
	e:					
	10 10					
	:					
	6 4					
	Oct			Oct Nov Dec Jan	Oct Nov Dec Jan Feb	Oct Nov Dec Jan Feb Mar 2/2 3/16 3/16 3/2 3/16 3/2 3/27



August 27, 1997

Roy Crystal U.S. EPA Region 1 Air Pesticides and Toxics Mail Code: SEA JFK Federal Building Boston, MA 02203

Re: Revised Emissions Test Protocol

Dear Mr. Crystal:

Please find the included revised "Chromium Emissions Test Protocol" for Superior Plating located in Southport, Connecticut. This is in response to your letter to me dated August 22, 1997.

Sincerely,

Air Tox Environmental Company, Inc.

Dan Aune

Business Manager

cc: Jack Harvanek, U.S. EPA Region 1



Twin Fiber-bed Chromium Electroplating Demisters

EMISSIONS TEST RESULTS

Superior Plating Co. Southport, Connecticut

Prepared for:

Mr. Richard Durazzo Superior Plating Co.

Prepared by:

Dan E. Aune Project Manager

August 1997

Air Tox Project No. 96029

TABLE OF CONTENTS

1.0	INTRODUCTION	2
2.0	TEST RESULTS AND DISCUSSION	3
3.0	PROCESS AND OPERATIONS	4
	Table 3.1 - Tank Specifications	5
4.0	SAMPLING AND ANALYTICAL METHODOLOGIES	6
	4.1 Apparatus	6
	4.2 Procedures	7
	4.2.1 Measurement of Stack Gas Velocity	7 8 9 10
	4.2.3 Laboratory Analysis	11
5.0	QUALITY ASSURANCE	12

1.0 INTRODUCTION

Air Tox Environmental Company, Inc. of Willington, Connecticut was retained by Superior Plating Co. of Southport, Connecticut to perform compliance testing on two fiber bed demister control devices servicing chromium electroplating processes. The purpose of this testing was to fulfill the compliance testing requirements of the Chromium NESHAP MACT standard.

The test program described within this report was performed on August 29, 1997. Each of the two fiber bed control devices were tested simultaneously using two chromium emissions sampling trains. The compliance program was completed under the supervision of Dan Aune, Project Manager of Air Tox and Richard Durazzo of Superior Plating. The testing was witnessed by Mark Elgar of the Connecticut Department of Environmental Protection.

Section 2.0 of this report presents the test results and discussion. A description of the process and operations is presented in Section 3.0. Sampling and analytical methodologies, including a detailed description of the sampling train, are presented in Section 4.0. Air Tox's quality assurance plan is detailed in Section 5.0. A copy of the notification of compliance status form, calibration, sample field data sheets, and example calculations are contained in the Appendix.

2.0 TEST RESULTS AND DISCUSSION

The purpose of this testing program was to demonstrate compliance with the National Emissions Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Anodizing Tanks, which were published in the Federal Register on January 25, 1995.

Superior Plating utilizes two fiber bed demisters (FBDs) to control chromium emissions from 21 hard chrome electroplating tanks. The chromium mist generated by the tanks is pulled from each tank through single sided lateral exhaust hoods and then through a tunnel system to FBD #2 or FBD #3. Schematics of the tunnel configuration were included in the Appendix of the previously submitted protocol. A 23,000 acfm fan is utilized to pull the vapors through FBD #2 and out through a 48" X 48" square stack, and a 45,000 acfm fan is utilized to pull the vapor through FBD #3 and out through a 48" X 48" square stack.

Chromium sampling and analysis was carried out on each of the two stacks in accordance with EPA Method 306A (60 FR 4986). The test program also utilized EPA Reference Methods 1 and 2. As specified in Method 306A, three two-hour sample tests were completed for each stack. Analysis of the test samples were performed by an accredited laboratory for total chromium. The total chromium content and test data was then used to calculate the total chromium emissions rate for each test in mg/dscm. The average emissions rate for the three sample tests per stack was 0.035 mg/dscm for FBD #2 and 0.028 mg/dscm for FBD #3 as presented in Table 2.1. This testing demonstrated that the chromium emissions from the FBDs are greater than the applicable emission limit of 0.015 mg/dscm when the electroplating processes are operating at maximum attainable amperage.

Table 2.1

FBD#	Test #	Time	Emissions Rate (in mg/dscm)
2	1	9:10 - 11:10	0.048
2	2	11:22 - 13:25	0.030
2	3	13:38 - 15:45	0.026
Average 2			0.035
3	1	9:10 - 11:10	0.026
3	2	11:22 - 13:25	0.029
3	3	13:38 - 15:45	0.028
Average 3			0.028

3.0 PROCESS AND OPERATIONS

Superior Plating is a custom job shop that performs hard chrome electroplating for the aircraft industry, gun manufacturers, machinery, cylinders, bearings, and other miscellaneous parts where corrosion resistance, wear or hardness is required. Parts in general are various alloys of steel and aluminum.

Please refer to Table 3.1 for a listing of each of Superior Plating's tanks and their specifications. Superior Plating's maximum cumulative rectifier potential is 897 million ampere-hours per year, thus classifying their facility as a large source. The rectifier amperages and pressure-drop measurements during testing were documented, but will not be presented in this test report because this test does not demonstrate continual compliance. The tested emissions rate for both FBD #2 and FBD #3 exceeded the MACT reguirement, therefore the process data (rectifier amperages and pressure-drop) measured during testing cannot be used to establish compliant monitored parameter ranges.

Table 3.1 Tank Specifications

Tank Number	Tank Length	Tank Width	Tank Height	Fluid level	Volume (gallons)	Rectifier Amperage	CrO , Conc. (g/l)	Vented to FBD
18	84	36	48	42	550	10000	240-270	#2
19	156	48	60	54	1750	9000	250-280	#2
20	120	36	36	31.5	589	7500	375-420	#2
21	48	48	48	45	449	1500	275-300	#2
23	288	42	48	42	2199	12500	250-280	#2
24	84	36	96	90	1178	9000	250-280	#2
31	84	36	48	42	550	4000	240-260	#3
32	84	36	48	42	550	9300	240-260	#3
33	84	36	72	66	864	7500	240-260	#3
34	84	36	48	42	550	3800	240-260	#3
37	144	36	48	42	943	15000	240-270	#3
43	84	36	48	42	550	4500	240-260	#3
44	144	36	48	42	943	7500	240-260	#3
45	120	36	48	42	785	4800	250-280	#3
46	120	36	48	42	785	9500	275-300	SAME REPORT OF THE PROPERTY OF
55	36	36	120	112	628	4000	250-280	#3
56	84	36	48	42	550	4500	275-300	#3
60	84	36	144	138	1807	9000	240-260	#3
61	84	36	144	138	1807	12000	240-260	#3
62	*NO RECTIFIERS	CONNECTED, I	JSED FOR CHRO	ME RECYCLING	ONLY.		Envient.	
63			JSED FOR CHRO					#3 #3
64A	24	48	52	46	229	4500	240-260	#3
64B	120	48	48	40	997	3000	325-425	#3
mmulative Re	ctifier Amperag	е				152400	ALT: MIT	

4.0 SAMPLING AND ANALYTICAL METHODOLOGIES

As stated earlier, chromium sampling and analysis was carried out in accordance with EPA Method 306A (60 FR 4986). The testing program also utilized EPA Reference Methods 1 and 2. One of the two Method 306A sampling trains assembled for this testing was slightly modified to allow for better flexibility in adjusting to the desired sampling rate of 0.75 cfm. For clarity, only this modified sampling train is described below. The second of the two trains was identical except for the substitution of a Method 306 vacuum pump/dry gas meter assembly.

4.1 Apparatus

Measurements of stack gas velocity and volumetric flow rates were taken using an S-type pitot tube and an incline manometer. A protractor was attached to the pitot tube for cyclonics verification. Stack gas temperatures were taken with a digital thermometer and K-type thermocouple.

The sampling train probe assembly consisted of a thick-wall polypropylene probe nozzle sheathed within a section of 0.75 inch steel conduit. The exposed tip of the polypropylene probe was beveled. The probe assembly was attached to a "mason jar" impinger train assembly by a flexible polypropylene sample line.

The sample train impinger assembly consisted of three one-quart "mason jars" with Teflon vacuum seal lids. The sample line was connected to a polypropylene impinger tube that passed through the first jar's vacuum seal lid and terminated 3/16 inches from the bottom of the jar. This first jar contained 250 ml of 0.1 N sodium hydroxide. The first jar's vacuum seal lid had an outlet that was connected to the second jar via a similar polypropylene impinger tube that terminated 1 inch from the bottom of the empty second jar. The outlet of the second jar was attached to the third jar containing silica gel via an impinger tube terminating 1/2 inch above the bottom of the third jar. The third jar outlet was attached to approximately 10 feet of polypropylene tubing that in turn was attached to a needle valve/vacuum pressure gauge assembly.

A needle valve/vacuum pressure gauge assembly replaced the critical orifice specified within Method 306A. Air Tox chose to use a needle valve to adjust the sample flow. Results of previous experimentation on Method 306A sampling trains utilizing a critical orifice have shown that it is nearly impossible to consistently approximate a flow rate of 0.75 cfm. There are many other variables affecting flow rate besides the diameter of the critical orifice such as length of sample lines and stack gas pressures. Air Tox has demonstrated in previous testing efforts that using a needle valve to adjust the sample vacuum pressure to approximately -8" Hg yielded a sample flowrate of 0.75 cfm. The needle valve and or vacuum pressure was not

adjusted after being initially set thus insuring a consistent sample flow at each sample point.

The needle valve/pressure gauge assembly was attached to the inlet of a Gast Model 0522-V103-G18DX vacuum pump. The new versions of this pump integrate a oil trap in the pump head assembly. The outlet of the pump was attached to the dry gas meter with polypropylene tubing. Dry gas temperature readings were taken with a dial thermometer mounted at the meter outlet.

As mentioned earlier, the reagent used in sampling was 0.1N sodium hydroxide. A polypropylene wash bottle containing sodium hydroxide solution was used in all wash-down and recovery procedures.

4.2 Procedures

4.2.1 Measurement of Stack Gas Velocity

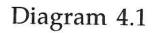
Both of Superior's stacks are identical. They are both 48" X 48" square stacks. Port and traverse point locations were determined in accordance with EPA Method 1. Measurements of ΔP and cyclonic flow were taken at each of the five traverse points in ports numbered 1 through 5 according to Methods 1 and 2. The ΔP measurements were taken using the S-type pitot tube and an incline manometer. The flow angle measurements were taken at each traverse point using a protractor attached to the pitot tube. These measurements were taken once at the beginning of the test day. Diagram 4.1 illustrates the stack sampling locations for both stacks.

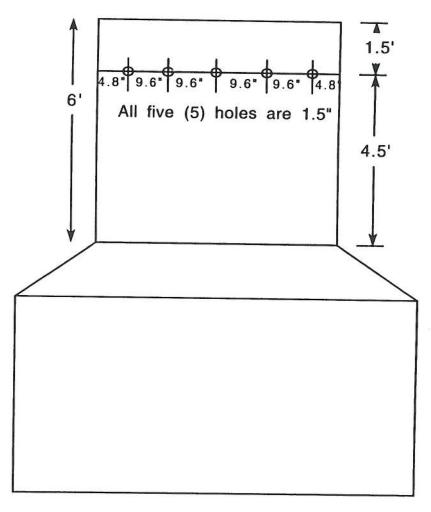
The ΔP numbers were input into a computer spreadsheet that calculated the "point sampling times" according to equation 306A-1 of the method. The flow angles were also averaged to verify the average was less than 20 degrees thus verifying that cyclonics were within acceptable limits.

4.2.2 Sampling

The sampling trains were assembled as shown in Diagram 4.2 (Diagram 4.3 illustrates the assembly of second train utilizing the Method 306 vacuum pump/dry gas meter assembly). The first impinger jar was prerinsed with 0.1N sodium hydroxide and then charged with 250 ml of 0.1N sodium hydroxide. The second impinger jar was also rinsed with the 0.1N sodium hydroxide and then left empty. The third impinger jar was charged with silica gel. After charging, the three impinger jars were iced down. The sample train was leak checked prior to each testing period.

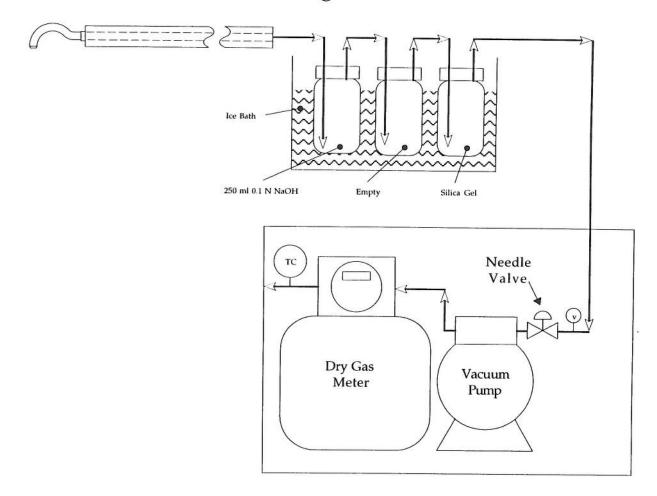
After leak checking the sampling train, the probe/nozzle was inserted into the stack at port 1, traverse point 1. The vacuum pump was turned on





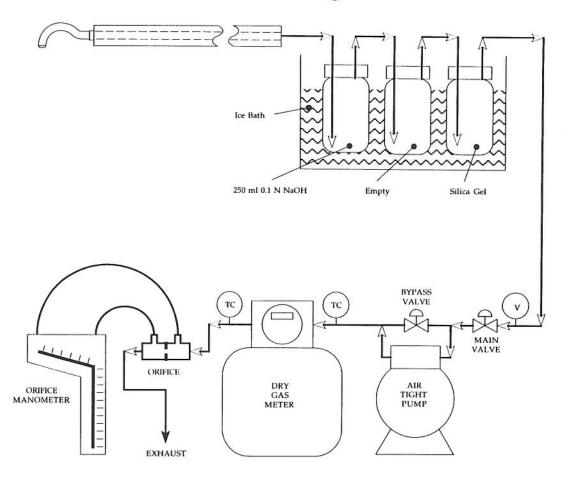
KEY:	CUSTOMER:	Superior Plating Company	AIR TOX ENVIRONMENTAL CO., INC.						
	LOCATION:	Southport Connecticut	165 RIVER ROAD, PO BOX 239 WILLINGTON, CONNECTICUT 06279						
	TITLE:	Samping Port Locations for Two Identical Stacks	DATE MADE: 6/23/97	DATE PRINTED:	DATE REVIEWED:				
			PROJECT NO:	DRAWING NO.:	PAGE NO.:				
			PREPARED BY: DEA	REVIEWED BY:	APPROVED BY:				

Diagram 4.2



KEY:	CUSTOMER:	Superior Plating	AIR TOX ENVIRONMENTAL CO., INC.							
	LOCATION:	Southport, Connecticut	165 RIVER ROAD, PO BOX 239 WILLINGTON, CONNECTICUT							
	TITLE:	SPECIAL NAVE OF ASSESSMENT OF THE THEORY OF	DATE MADE:	5/5/97	DATE PRINTED:	DATE REVIEWED:				
		Method 306A Sampling Train	PROJECT NO:		DRAWING NO.:	PAGE NO.:				
			PREPARED BY:	DEA	REVIEWED BY:	APPROVED BY:				

Diagram 4.3



KEY:	CUSTOMER:	Superior Plating	AIR TOX ENVIRONMENTAL CO., INC.							
	LOCATION:	Southport, Connecticut	165 RIVER ROAD, PO BOX 239 WILLINGTON, CONNECTICUT 06279							
	TITLE:		DATE MADE: 3/18/97	DATE PRINTED:	DATE REVIEWED:					
		Method 306A Sampling Train	PROJECT NO:	DRAWING NO.:	PAGE NO.:					
			PREPARED BY: DEA	REVIEWED BY:	APPROVED BY:					

and the correct vacuum pressure was set immediately. The probe nozzle was held at each traverse point for the time interval calculated for that point. At the end of the first port traverse, the vacuum pump was turned off until the probe was moved into the next port. Each of the four remaining ports were traversed in the same manner as the first port. The overall duration of each sample run was two hours. Each point sampling time was calculated per the following equation.

Minutes at point n =
$$\frac{\sqrt{\text{Point n }\Delta P}}{\left(\sqrt{\Delta P}\right)\text{avg}}$$
 x 5.0 minutes

After the sample train passed a post-test leak check, the sample was recovered. The first jar functioned as the sample container jar. The outside of the first impinger stem was rinsed into the first jar as well as the contents of the second jar and the tube that connects the first and second jar. The probe/nozzle and sampling line were also rinsed into the first jar. This was done by injecting the 0.1N sodium hydroxide into the end of the probe/nozzle and sampling line while drooped between two people and then raising the tubing to force the sodium hydroxide down the tube to be released into the first impinger jar. This was repeated three times. The collected sample was sealed in the jar and labeled with a sample number. The liquid level was marked to gauge any sample loss.

4.2.3 Laboratory Analysis

Each of the sampling procedures outlined above were repeated until three two-hour samples were collected for each stack. These samples were then sent to Environmental Health Labs (EHL) of Cromwell, Connecticut. EHL is an accredited laboratory for this type of analysis. In accordance with method 306A, the samples were analyzed by atomic adsorption spectrophotometry (AA). Prior to being analyzed by the AA, the samples were digested with acid to concentrate the sample and provide a lower detection limit. The lower detection limit for the AA is <2.5 ug based on an average sample volume of 250 ml. EHL has submitted Standard Operating Procedures (SOP) to Jack Harvanek of U.S. EPA.

5.0 QUALITY ASSURANCE

The project manager is responsible for implementation of the quality assurance program as applied to this project. Implementation of quality assurance procedures for source measurement programs is designed so work was done:

- By competent, trained individuals experienced in the methodologies being used.
- Using properly calibrated equipment.
- Using approved procedures for sample handling and documentation.

Measurement devices, pitot tubes, dry gas meters, and thermocouples are uniquely identified and calibrated with documented procedures and acceptance criteria before and after each field effort. Records of all calibration data are maintained in the files.

Data are recorded on standard forms. Bound field notebooks are used to record observations and miscellaneous elements affecting data, calculations, or evaluation.

Prior to the test program Air Tox provides calibrations of all pitot tubes, dry gas meters, orifice meters, sampling nozzles, and thermocouples which are used during the test. All calibrations are performed within four months prior to the test date.

Probe and filter temperatures will be +/- 25 °F of the specified temperature.

In addition to the test samples, blank samples of reagents will be collected at the test site for background analyses. All blank samples will be analyzed in conjunction with actual test samples. Sampling results will be corrected for these backgrounds if required.

Appropriate sample recovery data will be recorded on the sample identification and handling logs, chain of custody forms and analytical data forms as presented in the Appendix. Recovered samples will be stored in shock-proof containers for storage and shipment for analyses.

Specific details of Air Tox's QA program for stationary air pollution sources may be found in "Quality Assurance Handbook for Air Pollution Measurement Systems", Volume III (EPA-600/4-7-027b).

Appendix

Applicable Rule:

40 CFR Part 63, Subpart N-National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Print or type the following for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title JOHN RAYMOND / PRE	SIDENT	
Street Address LACEY PLACE		
City South PORT State CT	Zip Code	06490
Plant Name SUPPRIOR PLATING Co.		-
Plant Phone Number (203) 255 - 150		
Plant Contact/Title RICHARD DURAZZO		
Plant Address (if different than owner/operator's):		
Street Address SAME AS ABOVE	5.	
City State	Zip Code	

2. Complete the following table. If additional lines are needed, make copies of this page.

Tank ID#		of tank		plicable sion limit		of control	Control system ID #	de	ethod to etermine mpliance			Type and quantity of HAP emitted ²	
18	HARD	CHROME	0.015	MADEN	FIBER	REFOR	#2	Perf	PMALE	EPA M	ETHED BUCA		
20							\vdash		-	+-	-	-	*
21													

¹If a performance test was conducted, submit the test report containing the elements required by

Tank ID#	Type of tank	Applicable emission limit	Type of control technique	Control system ID #	Method to determine compliance l	Test method followed	Type and quantity of HAP emitted ²
1	Hard chrome plating	0.015 mg/dscm	Composite mesh- pad system	10	Performance test	EPA Method 306	Cr 0.009 mg/dscm
2	Chrome anodizing	45 dynes/cm	Wetting agent fume suppressant	N/A	Surface tension measurement	EPA Method 306B	Cr 40 dynes/cm
3	Decorative chrome plating	0.01 mg/dscm	Foam blanket	N/A	Performance test	EPA Method 306A	Cr 0.005 mg/dscm

⁴⁰ CFR 63.344(a).

2If the compliance procedures of 40 CFR 63.344(e) are being followed, attach the calculations needed to support the emission limit expressed in mg/hr.

Applicable Rule:

40 CFR Part 63, Subpart N-National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Print or type the following for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title JOHN RAYMOND / PR	SUDAIT
Street Address	
City Southfort State CT	Zip Code 06490
Plant Name SUPERIOR PLANING Co.	
Plant Phone Number (203) 255-1501	
Plant Contact/Title ZICHARD DURAZZO	
Plant Address (if different than owner/operator's):	
Street Address - SAME AS ABOVE	
City State	Zip Code

2. Complete the following table. If additional lines are needed, make copies of this page.

Tank ID # Type of tank		Type of tank Applicable emission lim		n limit technique		Control system ID #	determine		Test method followed		Type and quantity of HAP emitted	
24	HARDOHROME	0,005 mg	bscm	FIBRIL	15/6/L	#2	ALRF.	TIST	FERA ME	TOTO 30HA	00	out make
-		-				#3				ı	Co	0.026 Mg/05
32												1
33												
77		₩		*	-	0	7	1				

¹If a performance test was conducted, submit the test report containing the elements required by

Tank ID#	Type of tank	Applicable emission limit	Type of control technique	Control system ID #	Method to determine compliance ¹	Test method followed	Type and quantity of HAP emitted ²
1	Hard chrome plating	0.015 mg/dscm	Composite mesh- pad system	10	Performance test	EPA Method 306	Cr 0.009 mg/dscm
2	Chrome anodizing	45 dynes/cm	Westing agent fume suppressant	N/A	Surface tension measurement	EPA Method 306B	Cr 40 dynes/cm
3	Decorative chrome plating	0.01 mg/dscm	Foam blanket	N/A	Performance test	EPA Method 306A	Cr 0.005 mg/dscm

⁴⁰ CFR 63.344(a).

2If the compliance procedures of 40 CFR 63.344(e) are being followed, attach the calculations needed to support the emission limit expressed in mg/hr.

Applicable Rule:

40 CFR Part 63, Subpart N-National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks

1. Print or type the following for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title JOHN RAYMOND	/ PRESIDENT
Street Address LACY PLACE	
City Southfort State CT	Zip Code _06490
Plant Name SUPERIOR PLATING CO.	
Plant Phone Number (203) 255-1501	
Plant Contact/Title RICHARD DURARTO	
Plant Address (if different than owner/operator's):	
Street Address - SAME AS ABOVE	
City State	Zip Code

2. Complete the following table. If additional lines are needed, make copies of this page.

Tank ID#	Type of tank	Applicable emission limit	Type of control technique	Control system ID #	Method to determine compliance1	Test method followed	Type and quantity of HAP emitted
37 43	HARD CHROME	0.015 NS/DSCH	FIBELBER	#3	PERE TEST	ERA METHOD 306	C/2 0.026 M2/05
44							
410	15	05	•	10			

¹If a performance test was conducted, submit the test report containing the elements required by

40 CFR 63.344(a).
²If the compliance procedures of 40 CFR 63.344(e) are being followed, attach the calculations needed to support the emission limit expressed in mg/hr.

Tank ID#	Type of tank	Applicable emission limit	Type of control technique	Control system ID #	Method to determine compliance 1	Test method followed	Type and quantity of HAP emitted ²
1	Hard chrome plating	0.015 mg/dscm	Composite mesh- pad system	10	Performance test	EPA Method 306	Cr 0.009 mg/dscm
2	Chrome anodizing	45 dynes/cm	Wetting agent fume suppressant	N/A	Surface tension measurement	EPA Method 306B	Cr 40 dynes/cm
3	Decorative chrome plating	0.01 mg/dscm	Foam blanket	N/A	Performance test	EPA Method 306A	Cr 0.005 mg/dscm

Applicable Rule:

40 CFR Part 63, Subpart N-National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium

Anodizing Tanks

1. Print or type the following for each plant in which chromium electroplating and/or chromium anodizing operations are performed.

Owner/Operator/Title	DPES	N71-
Street Address _ CHCH PLACE		
City Southfort State CT	Zip Code	06490
Frant Name _ SUPERIOR TRADING ()	p coab .	0470
Plant Phone Number (203) 255-150/		
Plant Contact/Title RICHARD DURAZZO		
Plant Address (if different than owner/operator's):		
Street Address SAME AS ABOVE -		
City State	Zip Code	

2. Complete the following table. If additional lines are needed, make copies of this page.

Tank ID#	Тур	e of tank	emissi	n limit		of control	System ID #	de	ethod to termine upliance 1	Test :	nethod owed	Type at	nd quantity
56	ПОКО	THOME	10.015	MA/DSCA	F. REL	MISTER	1#3	FEEF	TEST	EPA ME	THOU 306	C/2 0.	Permitted ²
601							\vdash	-	+				-
611							 		-	 			
GIL	- +	7	7	5	-	>	1	-		-			

¹If a performance test was conducted, submit the test report containing the elements required by

Tank ID#	Type of tank	Applicable emission limit	Type of control technique	Control system ID #	Method to determine compliance 1	Test method followed	Type and quantity of HAP emitted ²
	Hard chrome plating	0.015 mg/dscm	Composite mesh- pad system	10	Performance test		Cr 0.009 mg/dscm
2	Chrome anodizing	45 dynes/cm	Weening agent fume suppressant	N/A	Surface tension	EPA Method 306B	Cr 40 dynes/cm
3	Decorative chrome plating	0.01 mg/dscm	Foam blanker	N/A		EPA Method 306A	Cr 0.005 mg/dscm

⁴⁰ CFR 63.344(a).

2If the compliance procedures of 40 CFR 63.344(e) are being followed, attach the calculations needed to support the emission limit expressed in mg/hr.

NOTIFICATION OF COMPLIANCE STATUS (continued)

 Complete the following table for each control technique used. If additional lines are needed, make copies of this page

Control	Tank	Range of site-specific operating parameter values 1					
system ID #	ID #(s)		Velocity pressure		Foam blanket thickness		
#2	18-24	_		_			
#3	31-643		_	_	_		

If the applicable monitoring and reporting requirements to demonstrate continuous compliance differ from those in 40 CFR Part 63, subpart N, attach a description. Parameter value ranges are established through initial performance testing and are those that correspond to emissions at or below the level of the standard(s).

EXAMPLE RESPONSE:

Control	Tank	Rar	ige of site-specific	operating paramete	r values 1
system ID #	ID #(s)	Pressure drop	Velocity pressure	Surface tension	Foam blanket thickness
10	1	7 in. w.c. ± 1 in.	N/A	N/A	N/A
N/A	2	N/A	N/A	≤45 dynes/cm	N/A
N/A	3	N/A	N/A	N/A	≥1 inch

4. Complete the following if hard chromium electroplating tanks are operated (check the box(es) that apply):

The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is greater than or equal to 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.

The maximum cumulative potential rectifier capacity of the hard chromium electroplating tanks is less than 60 million amp-hr/yr. This was determined by taking the sum of the total installed rectifier capacity (amperes) multiplied by 8,400 hours/yr and by 0.7 for each tank.

Records show that the facility's previous annual actual rectifier capacity of the hard chromium electroplating tanks was less than 60 million amp-hr/yr. If so, submit the records that support this rectifier capacity for any 12-month period preceding the compliance date, or submit a description of how operations will change to meet this rectifier capacity limit. For new sources, the capacity can be that projected for the first 12-month period of tank operation.

X

8864875807→

NO.3803 25P.2618:# 7

(Date)

NUTIFICATION OF COMPLIANCE STAT

		a ararus (constant)
	The facility has accepted or will accept a Federally on the maximum completive potential racifier capa	-emissessble lieux of 60 million susp-hr/yr may of the head character electroplating
5. C	Treek one of the following boxes that describes the fac	flity's compilment status:
2	The facility is in compliance with the provisions of The facility is not in compliance with the provision	40 CFR part 63, subpart N. s of 40 CFR part 63, subpart N
e. Pr	runt of type the name and this of the Responsible Office	tal for the pience
-	JOHN RAMMOND	PRESIDENT
A 9	(Name)	(Title)
A WIRE	comple Official ear pe:	e
	The president, vice-president, secretary, of treasurer The owner of the plant: The plant angineer or supervisor; A government official if the plant is owned by the Frederick or A ranking military officer if the plant is located on a	mieral, State, Clay, or Commi
I Ca	ervity That An Operation And Maintenance Flan Has at Wesk Fractice Standards Of 40 (FF. 63.342(f) And	
~	(8)	
	(Signature of Responsible Official)	
I Cor	Chowledge.	(Desc)

(Signature of Responsible Official)

Superior Compliance Test - 8/29/97 Calculated Stack Concentration - FBD #2 (25 hp)

$$C_{Cr} = \underbrace{(M_{Cr})(T_m + 460)}_{(499.8)(Y_m)(V_m)(P_{bar})}$$

M_{Cr=} Amount of Cr in sample (μg)

T_m= Dry gas meter temperature

Y_m= Dry gas meter correction factor

V_m= Dry gas meter volume (ft³)

P_{bar}= Barometric pressure

Test #1	C _{Cr} = 0.048 m	ng/dscm
	$M_{Cr} = 123$	
	$T_m = 74$	
	$Y_{m} = 1.033$	
	$V_{\rm m} = 88.49$	
	$P_{bar} = 29.79$	

Test #2	C _{Cr} = 0.03 mg/dscm
	$M_{Cr} = 75.5$
	$T_{m} = 82$ $Y_{m} = 1.033$
	$V_{m} = 90.04$
	$P_{bar} = 29.81$

Test #3	C _{Cr} = 0.026	mg/dscm
	$M_{Cr} = 65.5$	
	$T_m = 84$	
	$Y_{m} = 1.033$	
	$V_{m} = 88.9$	
	$P_{bar} = 29.81$	

Average emission rate = 0.035 mg/dscm (Superior's limit is 0.015 mg/dscm)

Superior Compliance Test - 8/29/97 Calculated Stack Concentration - FBD #3(75 hp)

$$\begin{split} C_{\text{Cr}} &= \quad \frac{(M_{\text{Cr}})(T_{\text{m}} + 460)}{(499.8)(Y_{\text{m}})(V_{\text{m}})(P_{\text{bar}})} \end{split}$$

M_{Cr=} Amount of Cr in sample (μg)

T_m= Dry gas meter temperature

Y_m= Dry gas meter correction factor

V_m= Dry gas meter volume (ft³)

P_{bar}= Barometric pressure

Test #1	$C_{Cr} = 0.026$	mg/dscm
	$M_{Cr} = 61.3$	
	$T_m = 75$	
	$Y_{m} = 0.98$	
	$V_m = 88$	
<u> </u>	$P_{bar} = 29.79$	

Test #2	$C_{Cr} = 0.029$	mg/dscm
	$M_{Cr} = 69.1$	
	$T_m = 79$	
	$Y_{m} = 0.98$	
	$V_{m} = 89.5$	
	$P_{bar} = 29.81$	

Test #3	$C_{Cr} = 0$.	028	mg/dscm
	$M_{Cr} = 68$.8	
	$T_{\rm m} = 89$		
	$Y_{m} = 0.9$	98	
	$V_{m} = 91$.75	
	$P_{bar} = 29$.81	

Average emission rate = 0.028 mg/dscm (Superior's limit is 0.015 mg/dscm)

LABORATORY ANALYSIS REPORT

Environmental Health Laboratory a division of CIGNA Loss Control Services, Inc.



100 Sebethe Drive, Suite A-S Cromwell, CT 06416 (800) 243-4903 Cromwell (860) 635-6475

Laboratories in Macon, GA and Cromwell, CT

To:

Dan Aune

Air Tox Environmental Co., Inc.

165 River Rd. Suite B-1 Willington, CT 06279 Report No.:

9711106

P. O. No.:

Superior Plating

Date Received:

9/09/97

Date Reported:

9/17/97

Analysis: Chromium

Analytical Method: Atomic Abosorption Spectrophotometry; Modified EPA Method 306A

Sample Number	ug Chromium
Stack 2 Test 1	123
Stack 2 Test 2	75.5
Stack 2 Test 3	65.5
Stack 3 Test 1	61.2
Stack 3 Test 2	69.1
Stack 3 Test 3	68.8
Blank	<2.5

Analyst: Marjorie Luzzi Marjorie Luzzi Marjorie Luzzi

Date: 9/17/97

< = Less than

44IIVb 97IIV

Environmental Company AIR POX Environmental Solutions for Today's Industries

CHAIN OF CUSTODY

9/9/97 CL

AIR TOX ENVIRONMENTAL COMPANY, INC.

165 River Road

Willington, CT 06279

				***	milgion, CI oc	1217			
PROJECT DESCRIPTION			PROJECT NO.	9602	9	PROJECT NAME Caval Tool. Precomplaince			
FIELD SAMPLE NUMBER	DATE	TIME	COMPOSITE OR GRAB	ANALYSIS REQUIRED	SAMPLING TRAIN	SAMPLE DESCRIPTION	SPECIAL NOTES	SEND TO:	
Sack 2 Test 1	8/29/97		Composite	Total Chromium by AA - with digestion	306A	0.1 N NaOH	Please digest sample and perform analysis in accordance with 306A	EHL-Cromwell, CT	
Stack 2 Test 2	8/29/27		Composite	Total Chromium by AA - with digestion	306A	0.1 N NaOH		EHL-Cromwell, CT	
Stack 2 Test 3	8/29/97		Composite	Total Chromium by AA - with digestion	306A	0.1 N NaOH	•	EHL-Cromwell, CT	
Blank		n/a	Grab	Total Chromium by AA - with digestion	306A	0.1 N NaOH			
	Please F	ax Resu	Its to Air To	x Environmental @	860-487-560)7			
Stack 3 Test 1	8/29/97								
Stack 3 Test 2	8/29/97							***	
Stack 3 Test 3	8/29/97								
Relinquished by:	(Signature)		DATE/TIME 9/s/42 4:40	Received by:(Signature)		DATE/TIME			
Relinquished by:	(Signature)		DATE/TIME	Received by:(Signature	e)	DATE/TIME			
Relinquished by:	(Signature)		DATE/TIME	Received by:(Signature)		DATE/TIME			
Relinquished by:	(Signature)		DATE/TIME	Received by:(Signature	e)	DATE/TIME			

Faxed 2:50 110127 Axx

tology that 1125 am

Stack Temp. 85°F

USEPA Reference Method 306A Rectangular Duct

Facility: Superior Plating

Location: 25 H. A Fau

Operator: JES DEA

Date: 8/29/97

Run No.

Stack No. or ID	25 HP.	(FBO # 2)
Stack Diameter		·
Pitot Coeff. (Cp)	0.84	
Baro. Press (Pbar)		"H

Port #	Point No.	ΔΡ	Cyclonics	Port #	Point No.	ΔΡ	Cyclonics
1	1	.14	50	4	1	,21	O°
	2	,21	5º		2	22	00
	3	.7,0	30		3	.22	00
	4	,21	30		4	.22	00
	5	, 14	30		5	. [[20
2	1	.72	b	5	1	.11	0°
	2	.VI	0		2	.19	00
	3	W	3°		3	.19	00
	4	22	0		4	. 21	00
	5	-21	$\mathcal{Y}^{\mathfrak{d}}$		5	.14	60
3	1	.21	6				
	2	.21	30		Service Lord	A STATE OF THE STATE OF	
	3	,21	0°				
	4	્રા	S°				24.00
	5	.21	20				

USEPA Reference Method 306A
(2 Hour Test)

Facility:	Superior Plating	Stack No. of ID	25HP (Stack 2)
Location:	Southport, CT	Stack Diameter	in.
Operator:	EJM. DBS	Calibration Factor (Y)	1.03
Date:	8/29/97	Pitot Coeff. (Cp)	0.84
Run No.	1	Baro. Press (Pbar)	29.79 "Hg
Leak rate be	efore run <u>< .O </u> cfm	Leak rate after run	< 0.01 cfm 85"
Stack Temp	. Start 85 °F	Stack Temp. End	<u>°</u> F

stack Temp. Start		0.0	Stack Temp. End								
Meter Volume Start		154.26	cu. ft.		Meter V	olume	End g	242.75	cu. ft.		
		SAMPL	E PORTS #1, =	2, & #3	3	T T		SAMI	LE PORTS #4	& #5	
Port No.	Pt. No.	Time (minutes)	Total Time (minutes)		Temp.	Port No.	Pt. No.	Time (minutes)	Total Time (minutes)	Meter (deg	
l	1	4.2	4.2	フム	71	4	1	5.2	77.5	75	72
	2	5.2	9.4	72	70		2	5.3	82.8	15	78
	3	5.0	14.4	76	71		3	5.3	88.1	76	72
	4	5.2	19.6	77	72		4	5.3	93.3	77	72.
	5	4.2	23.8	77	12		5	3.7	97.1	77	70
2	1	5.3	29 .1	77	72	5	1	3.7	100.8	77	70
	2	5.3	34.3	17	73		2	4.9	105.7	78	7
,	3	5.3	39.6	77	73		3	4.9	110.6	78	7
	4	5.3	44.9 \$	77	73		4	5.2	115.8	78	7
	5	5.2	50.1	77	73		5	4.2	120.0	78	70
3	1	5.2	55.2	77	73						

(159.3)

267.5

Total Sample Volume Strt Volume) cu. ft.

60.4

65.5

70.7

72.3

2

3

4

5.2

5.2

5.2

1.6

Average Meter Temp.

74 (deg F)

USEPA Reference Method 306A (2 Hour Test)

Facility:	Superior P	lating		Stack No. or ID	25HP (Stack 2)
Location:	Southport,	СТ		Stack Diameter	in.
Operator:	EIM, DBS			Calibration Factor (Y)	1.03
Date:	8/29/97			Pitot Coeff. (Cp)	0.84
Run No.	Run No. 2			Baro. Press (Pbar)	29.81 "Hg
Leak rate be	efore run	_ 0	cfm [©] 5"H6	Leak rate after run	O cfm36"46
Stack Temp	. Start	91	°F	Stack Temps End	93_°F
Meter Volum	me Start	242.90	cu. ft.	Meter Volume End	332.94 cu. ft.
				7	

		SAMPL	E PORTS #1 .	±2, & #	3			SAMI	PLE PORTS #4		
Port	Pt.	Time	Total Time		r Temp.	Port	Pt.	Time	Total Time	Meter	
No.	No.	(minutes)	(minutes)	(de	eg F)	No.	No.	(minutes)	(minutes)	(deg	(F)
1	1	4.2	4.2	74	72	4	1	5.2	77.5	89	85
	2	5.2	9.4	74	72		2	5.3	82.8	89	85
	3	5.0	14.4	75	72		3	5.3	88.1	89	85
	4	5.2	19.6	77	73		4	5.3	93.3	29	85
	5	4.2	23.8	77	74		5	3.7	97.1	29	85
2	1	5.3	29.1	81	74	5	1	3.7	100.8	FF	85
	Z	5.3	34.3	83	76		2	4.9	105.7	38	84
	3	5.3	39.6	82	77		3	4.9	110.6	89	84
	4	5.3	44.9	21	77		4	5.2	115.8	89	84
	5	5.2	50.1	83	78		5	4.2	120.0	88	84
3	l	5.2	55.2	73	78						
. jj. L	2	5.2	60.4	PP	80						
	3	5.2	65.5	88	81						
	4	5.2	70.7	90	84						
2460	5	1.6	72.3	90	85						

Total Sample Volume 70.04 cu. ft. Average Meter Temp. (deg F)
(End Volume - Start Volume)

USEPA Reference Method 306A
(2 Hour Test)

Facility:	Superior Plating	Stack No. or ID	25HP (Stack 2)		
Location:	Southport, CT	Stack Diameter	in.		
Operator:	EJM, DBS	Calibration Eactor (Y)	1.03		
Date:	8/29/97	Pitot Coeff (Cp)	0.84		
Run No.	3	Baro. Press (Pbar)	29.81 "Hg		
Leak rate be	efore run <	Leak rate after run	<0.01 ctm 86 1/16		

Stack Temp. Start	<u>93</u> %	Stack Temp. End	95°F
Meter Volume Start	333.15 cu. ft.	Meter Volume End	423.05 cu. ft.

		SAMPLI	E PORTS #1,					SAMPLE PORTS #4 & #5			
Port No.	Pt. No.	Time (minutes)	Total Time (minutes)		r Temp. eg F)	Port No.	Py, No.	Time (minutes)	Total Time (minutes)	Meter (de	
1	1	4.2	4.2	86	84	4	1	5.2	77 .5	88	8
	2	5.2	9.4	85	84		2	5.3	8 2.8	38	8
	3	5.0	14.4	185	84		3	5.3	88.1	87	y
	4	5.2	19.6	PG	83		4	5.3	93.3	87	y
	5	4.2	23.8	X	83		5	3.7	97.1	86	8
2	1	5.3	29.1	16	83	5	1	3.7	100.8	85	2
	2	5.3	34.3	86	32		2	4.9	105.7	85	80
	3	5.3	39.6	86	87		3	4.9	110.6	86	80
	4	5.3	44.9	26	82		4	5.2	115.8	85	80
	5	5.2	50.1	X	82		5	4.2	120.0	83	8
3	1	5.2	55 .2	86	84						(* 0)
-	2	52	60.4	87	82			T H			
	3	5.2	65.5	87	83			1			
	4	5.2	70.7	88	831	}	1111				
	5	1.6	72.3	88	83						

Total Sample Volume 39.90 cu. ft. (End Volume - Start Volume)

Average Meter Temp.

84 (deg F)



Lo

USEPA Reference Method 306A Rectangular Duct STACK TEMP 89°F

Facility:	Superio	or Plating
Location	: 75 It.P.	System
Operator	: 165 1	SEA
Date:	8/29/9	7
Run No	-,-,	

Stack No. or ID	75	H.P.	(FBD	#3
Stack Diameter				
Pitot Coeff. (Cp)	0.	34		
Baro. Press (Pbar)				— "Нg

Port	Point	ΔΡ	Cyclonics	Port	Point	ΔΡ	Cyclonics
#	No.			#	No.		
1	1	,44	40	4	1	,50	70
	2	.68	-5°		2	.67	70
	3	,62	0 5°		-3	.62	50
	4	.62	5°		4	.65	90
	5	.45	30		5	.64	40
2	1	54	110	5	1	.47	110
	2	.65	50		2	-63	70
	3	.59	50		3	.63 .57	50
	4	ماما ،	50		4	.61	2°
	5	.62	50		5	.32	30
3	1	.64	110				
	2	.66	60	Sep. 12.			
	3	.58	70				
	4	.45	7 °				
	5	.65	-30				

USEPA Reference Method 306A
(2 Hour Test)

Facility:	Superior Plating	Stack No. or ID	75 H.P.(Stack 3)
Location:	Southport, CT	Stack Diameter	48"x 48" in.
Operator:	JES, DEA	Calibration Factor (Y)	0.98
Date:	8/29/97	Pitot Coeff. (Cp)	0.84
Run No	1	Para Press (Phor)	1979 "

10 01		********	50 7/20 BE	
10.01	ctm	Leak rate after run	20.01	cfm
_89	°F	Stack Temp. End	91	°F
0	cu. ft.	Meter Volume End	352/	Cu. ft.
	10.02	89 °F	89 °F Stack Temp. End	89 °F Stack Temp. End

			E PORTS #1,				SAM	PLE PORTS #4	& #5
Port No.	Pt. No.	Time (min:sec)	Total Time (hr:min:sec)	Meter Temp. (deg F)	Port No.	Pt. No.	Time (min:sec)	Total Time (hr:min:sec)	Meter Temp. (deg F)
1	1	(4: 9)	(0:4:9)	72°	4	1	(4: 26)	(1:17:23)	75°
	2	(5: 10)	(0:9:20)	73°		2	(5: 8)	(1:22:31)	75°
	3	(4: 56)	(0:14:16)	73°		3	(4: 56)	(1:27:27)	760
	4	(4: 56)	(0:19:12)	740		4	(5: 3)	(1:32:31)	76€
	5	(4: 12)	(0:23:25)	740		5	(5: 1)	(1:37:32)	76
2	1	(4: 36)	(0:28:1)	าฯ	5	1	(4: 18)	(1:41:50)	360
	2	(5: 3)	(0:33:5)	74°		2	(4: 58)	(1:46:48)	760
	3	(4: 49)	(0:37:54)	75°		3	(4: 44)	(1:51:33)	770
	4	(5: 5)	(0:43:0)	75°		4	(4: 53)	(1:56:27)	770
	5	(4: 56)	(0:47:56)	76°		5	(3: 32)	(2:0:0)	77"
3	1	(5: 1)	(0:52:57)	76°					
	2	(5: 5)	(0:58:3)	76º				•	
	3	(4: 46)	(1:2:50)	76°					
	4	(5: 3)	(1:7:53)	760					
	5	(5: 3)	(1:12:57)	76°					

Total Sample Volume 350/4 cu. ft. Average Meter Temp. 75° (deg F) (End Volume - Start Volume) 88.0

Chromium Field Data Sheet USEPA Reference Method 306A (2 Hour Test) Facility: Superior Plating Stack No. or ID 75 H.P.(Stack 3) Location: Southport, CT Stack Diameter Operator: JES, DEA Calibration Factor (Y) Date: 8/29/97 Pitot Coeff. (Cp) 0.84 Run No. 2 Baro. Press (Pbar) cfm @ -15" Leak rate after run Leak rate before run °F Stack Temp. Start Stack Temp. End Meter Volume Start cu. ft. cu. ft. Meter Volume End

	SAMPLE PORTS #1 , #2, & #3				SAMPLE PORTS #4 & #5			& #5	
Port	Pt.	Time	Total Time	Meter Temp.	Port	Pt.	Time	Total Time	Meter Temp.
No.	No.	(min:sec)	(hr:min:sec)	(deg F)	No.	No.	(min:sec)	(hr:min:sec)	(deg F)
1	1	(4: 9)	(0:4:9)	730	4	1	(4: 26)	(1:17:23)	80°
	2	(5: 10)	(0:9:20)	74°		2	(5: 8)	(1:22:31)	80°
	3	(4: 56)	(0:14:16)	74°		3	(4: 56)	(1:27:27)	800
	4	(4: 56)	(0:19:12)	750		4	(5: 3)	(1:32:31)	80°
	5	(4: 12)	(0:23:25)	74°		5	(5: 1)	(1:37:32)	800
2	1	(4: 36)	(0:28:1)	780	5	1	(4: 18)	(1:41:50)	840
	2	(5: 3)	(0:33:5)	79°		2	(4: 58)	(1:46:48)	800
	3	(4: 49)	(0:37:54)	770		3	(4: 44)	(1:51:33)	82°
	4	(5: 5)	(0:43:0)	780		4	(4: 53)	(1:56:27)	940
	5	(4: 56)	(0:47:56)	75°		5	(3: 32)	(2:0:0)	840
3	1	(5: 1)	(0:52:57)	780					
	2	(5: 5)	(0:58:3)	796					
	3	(4: 46)	(1:2:50)	80°					
	4	(5: 3)	(1:7:53)	80°					
	5	(5: 3)	(1:12:57)	800					

Total Sample Volume	89.50	cu. ft.	Average Meter Temp.	79	(deg F)
(End Volume - Start Vol	ume)	_		3	

Chromium Field Data Sheet Start USEPA Reference Method 306A (2 Hour Test) Facility: Superior Plating Stack No. or ID 75 H.P.(Stack 3) Location: Southport, CT Stack Diameter Operator: JES, DEA Calibration Factor (Y) Date: 8/29/97 Pitot Coeff. (Cp) 0.84 Run No. 3 Baro. Press (Pbar) Leak rate before run Leak rate after run Stack Temp. Start °F Stack Temp. End

Meter Volume End

cu. ft.

Meter Volume Start

		SAMPL	E PORTS #1,	#2, & #3			SAM	PLE PORTS #4	& #5
Port No.	Pt. No.	Time (min:sec)	Total Time	Meter Temp.	Port	Pt.	Time	Total Time	Meter Temp.
1	1	(4: 9)	(hr:min:sec) (0:4:9)	(deg F)	No. 4	No.	(4: 26)	(hr:min:sec) (1:17:23)	(deg F)
	2	(5: 10)	(0:9:20)	870		2	(5: 8)	(1:22:31)	900
	3	(4: 56)	(0:14:16)	88°		3	(4: 56)	(1:27:27)	85° 0
	4	(4: 56)	(0:19:12)	82°		4	(5: 3)	(1:32:31)	क्षर
	5	(4: 12)	(0:23:25)	890		5	(5: 1)	(1:37:32)	860
2	1	(4: 36)	(0:28:1)	920	5	1	(4: 18)	(1:41:50)	860
	2	(5: 3)	(0:33:5)	930		2	(4: 58)	(1:46:48)	860
	3	(4: 49)	(0:37:54)	940		3	(4: 44)	(1:51:33)	26 E
	4	(5: 5)	(0:43:0)	93°		4	(4: 53)	(1:56:27)	850
	5	(4: 56)	(0:47:56)	92°		5	(3: 32)	(2:0:0)	85°
3	1	(5: 1)	(0:52:57)	940					
	2	(5: 5)	(0:58:3)	950					
	3	(4: 46)	(1:2:50)	540					
	4	(5: 3)	(1:7:53)	920					
	5	(5: 3)	(1:12:57)	900					

Total Sample Volume 91.75 cu. ft. Average Meter Temp. 89 (deg F) (End Volume - Start Volume)

CHROMIUM METER CALIBRATION WORKSHEET

CHROME METER NAME/#:

#3

DATE:

9/2/97

BAROMETRIC PRESSURE

30.80

TECH .:

Erik Mallory

STANDARD METER Y:

1.030

PRE-CAL:

POST-CAL:

X

STANDARD METER		CHROMIUM METER		METER .	DESCRIPTION OF THE PERSON OF T		
ORIFICE SETTING <u>AH in. H2O</u>	VOLUME Vs (cubic ft.)	AVERAGE TEMP (°F)		VOLUME Vm (cubic ft.)	TEMP. tmi (°F)		Y FACTOR
1.6	20.52	77		20.50	75	=	0.98
1.6	22.19	81		22.25	78	-	0.98
1.6	21.83	81		21.75	79		0.98

AVERAGE 0.98

CHROMIUM METER CALIBRATION WORKSHEET

CHROME METER NAME/#:

#3

DATE:

6/13/97

BAROMETRIC PRESSURE

29.59

TECH .:

Erik Mallory

STANDARD METER Y:

1.002

PRE-CAL:

х

POST-CAL:

STANDARD METER			CHROMIUM METER				
ORIFICE SETTING	VOLUME Vm (cubic ft.)	AVERAGE TEMP (°F)		VOLUME Vm (cubic ft.)	TEMP. tmi (°F)		Y FACTOR
1.9	21.84	77	a tell de la composition della	22.50	73	=	0.98
1.9	21.76	78		22.50	75		0.98
1.9	21.81	81		22.50	75		0.98
						AVERAGE	0.98

Method 5 Module Calibration Worksheet Pre-Test Calibration

Module #	1		R	un Numb	per	
Date	8/28/97	1	2	3	4	5
Calibration Orifice #		1	2	3	4	5
Orifice Coefficient (K')		0.446	0.514	0.665	0.938	0.999
Final Vm	(ft³)	100.47	110.63	121.00	131.61	143.26
Initial Vm	(ft³)	90.44	100.60	110.90	121.50	133.20
Difference Vm	(ft³)	10.03	10.03	10.1	10.11	10.06
Inlet Temp.						10.00
Initial	(°F)	75	76	76	77	78
Final	(°F)	77	78	81	85	80
Inlet Average	(°F)	76	77	79	81	79
Outlet Temp.						
Initial	(°F)	75	76	76	77	78
Final	(°F)	76	76	77	78	78
Outlet Average	(°F)	76	76	77	78	78
Average Meter Temp.	(°F)	76	77	78	79	79
Time	(0.00 min)	17.64	15.31	12.08	8.39	7.99
ΔΗ	("WC)	0.96	1.3	2.1	4.3	4.9
Barometric Pressure	("Hg)	29.90	29.90	29.90	29.90	29.90
Ambient Temp.	(°F)	75	<i>7</i> 5	<i>7</i> 5	75	75
Pump Vacuum	("Hg)	20	20	15	15	15
Vm(std)	cu. ft.	9.898	9.892	9.962	9.993	9.972
Vcr(std)	cu. ft.	10.170	10.173	10.384	10.173	10.318
Cal Factor (Y)		1.028	1.028	1.042	1.018	1.035
ΔΗ@		1.608	1.639	1.585	1.644	1.659

Averages

111 614 665					
Cal Factor (Y)	1.030				
Δ H @	1.627				

Pre-Test Calibration: Perform one >10 cf run with each orifice.

Post-Test Calibration: Perform three >10 cf runs with orifice corresponding to average Delta H from test program.

Each Y must be within ±2% of average.

Individual ΔH @'s must be ± 0.20 from average.

Method 5 Module Calibration Worksheet Post-Test Calibration

Module #	1	R	un Numb	er
Date	11/7/97	1	2	3
Calibration Orifice #	-	2	2	2
Orifice Coefficient (K')	-	0.514	0.514	0.514
Final Vm	(ft³)	682.15	692.16	702.17
Initial Vm	(ft³)	672.00	682.15	692.16
Difference Vm	(ft³)	10.15	10.01	10.01
Inlet Temp.				
Initial	(°F)	69	71	72
Final	(°F)	71	72	72
Inlet Average	(°F)	70	72	72
Outlet Temp.				
Initial	(°F)	69	69	70
Final	(°F)	69	70	71
Outlet Average	(°F)	69	70	71
Average Meter Temp.	(°F)	70	71	71
Time	(0.00 min)	15.75	15.45	15.45
ΔΗ	("WC)	1.3	1.3	1.3
Barometric Pressure	("Hg)	29.74	29.74	29.74
Ambient Temp.	(°F)	72	72	72
Pump Vacuum	("Hg)	20	20	20
Vm(std)	cu. ft.	10.089	9.931	9.917
Vcr(std)	cu. ft.	10.438	10.239	10.239
Cal Factor (Y)	-	1.035	1.031	1.033
ΔH@		1.661	1.658	1.655

Averages

Cal Factor (Y)	1.033
∆ H @	1.658

Pre-Test Calibration: Perform one >10 cf run with each orifice.

Post-Test Calibration: Perform three >10 cf runs with orifice corresponding to average Delta H from test program.

Each Y must be within ±2% of average.

Individual $\Delta H @$'s must be ± 0.20 from average.



Date: 9/29/97

Thermocouple #2 (Large Probe)

Ambient Temperature: 72°F

Barometric Preassure: 29.33

Technician: Erik Mallory

Reference:

Mercury-in-glass ASTM

Reference Point Number	Temperature Source	Reference Thermometer	Thermocouple Potentiometer	Temperature Difference
		Temperature	Temperature	Percent
0	Ice Bath	38	38	0.00%
		38	38	0.00%
		38	38	0.00%
100°C	Boiling Water	98	99	-0.19%
		98	99	-0.19%
		98	99	-0.19%
230°C	Boiling Oil	407	398	1.07%
1		400	392	0.96%
		396	387	1.08%

The absolute values of the test themometers and the thermocouple must agree within $\pm 1.5\%$

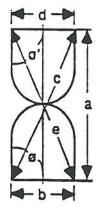
S-TYPE PITOT GEOMETRIC CALIBRATION PART 2 - PITOT ALIGNMENT

Probe Identification Technical Specialist Date July 3-1997

Probe 6-1 Erik Mallory

Pitot Identification ____ pitot 6-1

Transverse Tube Axis



$$\frac{a^2 + b^2 - c^2}{2ab} = \cos(\emptyset)$$

$$\frac{a^2 + d^2 - e^2}{2ad} = \cos(\emptyset')$$

$$(80^{\circ} < \emptyset < 100^{\circ})$$

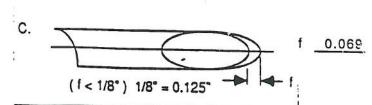
 $(80^{\circ} < \emptyset' < 100^{\circ})$

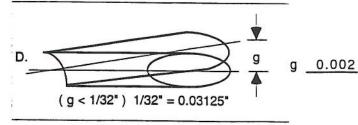
$$\frac{a^2 + b^2 - c^2}{2ab} = \cos(\emptyset)$$

$$\frac{a^2 + d^2 - e^2}{2ad} = \cos(\sigma')$$

$$(85^{\circ} < \emptyset < 95^{\circ})$$

 $(85^{\circ} < \emptyset' < 95^{\circ})$





NOTE: Values in parantheses are EPA Method 2 specifications.

PROBETHERMOCOUPLE CALIBRATION

Expected Stack Temperature (Ts) NA °R Mercury Thermometer (Tref) NA °R Thermocouple Readout NA °R Probe Identification _____ NA Technician NA

Tolerances

 $(Ts \pm 10\%)$ (Tref ± 1.5%)

Date 7/3/97